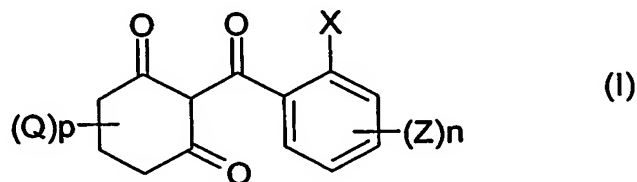


## CLAIMS

1. A herbicidal composition comprising:

(i) a 2-(substituted benzoyl)-1,3-cyclohexanedione of formula (I)



wherein X represents a halogen atom; a straight- or branched-chain alkyl or alkoxy group containing up to six carbon atoms which is optionally substituted by one or more groups  $-OR^1$  or one or more halogen atoms; or a group selected from nitro, cyano,  $-CO_2R^2$ ,  $-S(O)_mR^1$ ,  $-O(CH_2)_rOR^1$ ,  $-COR^2$ ,  $-NR^2R^3$ ,  $-SO_2NR^2R^3$ ,  $-CONR^2R^3$ ,  $-CSNR^2R^3$  and  $-OSO_2R^4$ ;

$R^1$  represents a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

$R^2$  and  $R^3$  each independently represents a hydrogen atom; or a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

$R^4$  represents a straight- or branched-chain alkyl, alkenyl or alkynyl group containing up to six carbon atoms optionally substituted by one or more halogen atoms; or a cycloalkyl group containing from three to six carbon atoms;

each Z independently represents halo, nitro, cyano,  $S(O)_mR^5$ ,  $OS(O)_mR^5$ ,  $(C_1-C_6)$ -alkyl,  $(C_1-C_6)$ alkoxy,  $(C_1-C_6)$ haloalkyl,  $(C_1-C_6)$ haloalkoxy, carboxy,  $(C_1-C_6)$ -alkylcarbonyloxy,  $(C_1-C_6)$ alkoxycarbonyl,  $(C_1-C_6)$ alkylcarbonyl, amino,  $(C_1-C_6)$ -alkylamino,  $(C_1-C_6)$ dialkylamino having independently the stated number of carbon atoms in each alkyl group,  $(C_1-C_6)$ alkylcarbonylamino,  $(C_1-C_6)$ -alkoxycarbonylamino,  $(C_1-C_6)$ alkylaminocarbonylamino,  $(C_1-C_6)$ -dialkylaminocarbonylamino having independently the stated number of carbon atoms in each alkyl group,  $(C_1-C_6)$ alkoxycarbonyloxy,  $(C_1-C_6)$ -alkylaminocarbonyloxy,  $(C_1-C_6)$ dialkylcarbonyloxy, phenylcarbonyl, substituted phenylcarbonyl, phenylcarbonyloxy, substituted phenylcarbonyloxy,

phenylcarbonylamino, substituted phenylcarbonylamino, phenoxy or substituted phenoxy;

$R^5$  represents cyano,  $-COR^6$ ,  $-CO_2R^6$  or  $-S(O)_mR^7$ ;

$R^6$  represents hydrogen or straight- or branched-chain alkyl group containing up to six carbon atoms;

$R^7$  represents  $(C_1-C_6)$ alkyl,  $(C_1-C_6)$ haloalkyl,  $(C_1-C_6)$ cyanoalkyl,  $(C_3-C_8)$ -cycloalkyl optionally substituted with halogen, cyano or  $(C_1-C_4)$ alkyl; or phenyl optionally substituted with one to three of the same or different halogen, nitro, cyano,  $(C_1-C_4)$ haloalkyl,  $(C_1-C_4)$ alkyl,  $(C_1-C_4)$ alkoxy or  $-S(O)_mR^8$ ;

$R^8$  represents  $(C_1-C_4)$ alkyl;

each Q independently represents  $(C_1-C_4)$ alkyl or  $-CO_2R^9$  wherein  $R^9$  is  $(C_1-C_4)$ -alkyl;

m is zero, one or two;

n is zero or an integer from one to four;

r is one, two or three; and

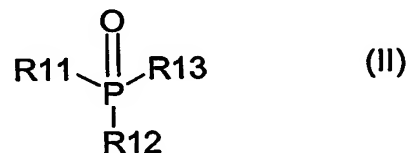
p is zero or an integer from one to six; and

(ii) an organic phosphate, phosphonate or phosphinate adjuvant at a concentration of less than 0.5% v/v when added to a spray tank as a tank mix additive or when co-formulated with a herbicide to produce a spray tank concentration of less than 0.5% v/v.

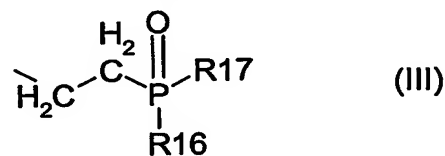
2. A herbicidal composition according to claim 1, wherein X is chloro, bromo, nitro, cyano,  $C_1-C_4$  alkyl,  $-CF_3$ ,  $-S(O)_mR^1$ , or  $-OR^1$ .
3. A herbicidal composition according to any one or claims 1 or 2, wherein each Z is independently chloro, bromo, nitro, cyano,  $C_1-C_4$  alkyl,  $-CF_3$ ,  $-OR^1$ ,  $-OS(O)_mR^5$  or  $-S(O)_mR^5$ .
4. A herbicidal composition according to any one of claims 1 to 3, wherein n is one or two.
5. A herbicidal composition according to any one of claims 1 to 4, wherein p is zero.

6. A herbicidal composition according to any one of claims 1 to 5, wherein the compound of formula (I) is selected from the group consisting of 2-(2'-nitro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 2-(2'-nitro-4'-methylsulphonyloxy benzoyl)-1,3-cyclohexanedione, 2-(2'-chloro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 4,4-dimethyl-2-(4-methanesulphonyl-2-nitrobenzoyl)-1,3-cyclohexanedione, 2-(2-chloro-3-ethoxy-4-methanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione and 2-(2-chloro-3-ethoxy-4-ethanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione.

7. A herbicidal composition according to any one of claims 1 to 6, wherein the phosphate, phosphonate or phosphinate adjuvant is a compound of formula II



- wherein  $\text{R}^{11}$  is an alkoxy group containing from 4 to 20 carbon atoms or a group  $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$  wherein  $\text{R}^{14}$  is hydrogen, methyl or ethyl,  $t$  is from 0 to 50 and  $\text{R}^{15}$  is hydrogen or an alkyl group containing from 1 to 20 carbon atoms; and  $\text{R}^{12}$  and  $\text{R}^{13}$  are independently (i) an alkyl or alkenyl group containing from 4 to 20 carbon atoms; (ii) optionally substituted phenyl; (iii) an alkoxy group containing from 4 to 20 carbon atoms or (iv) a group  $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$  as herein defined; or (v) a group of formula (III)



- wherein  $\text{R}^{16}$  is an alkoxy group containing from 4 to 20 carbon atoms or a group  $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$  as herein defined and  $\text{R}^{17}$  is an alkyl group containing from 4 to 20 carbon atoms, optionally substituted phenyl, an alkoxy group containing from 4 to 20 carbon atoms or a group  $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$  as herein defined; and wherein  $t$  is from 0 to ten.

8. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphate in which  $\text{R}^{11}$ ,  $\text{R}^{12}$  and  $\text{R}^{13}$  are all independently alkoxy groups.

9. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphonate in which  $R^{11}$  and  $R^{12}$  are both independently alkoxy groups and  $R^{13}$  is an alkyl, alkenyl or optionally substituted phenyl group.
- 5 10. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphinate in which  $R^{11}$  is an alkoxy group and  $R^{12}$  and  $R^{13}$  are both independently an alkyl, alkenyl or optionally substituted phenyl group.
11. A process for the control of weeds, said process comprising applying to the locus of the weeds a herbicidally effective amount of a composition as claimed in any one of claims 1 to 10.